DFI-10802/04
30606am/gs

CONCRETE FORMING SYSTEM

BACKGROUND OF THE INVENTION

I. FIELD OF THE INVENTION

The present invention relates generally to concrete panel forming systems.

II. DESCRIPTION OF RELATED ART

In order to form poured concrete walls, it has been the conventional practice to utilize concrete wall forms to form the cavity into which the concrete is poured. These concrete wall forms are typically constructed from rectangular panels that are secured together in a side-by-side relationship in order to form the concrete receiving cavity. An inside corner form having two perpendicular wall sections are typically used at the inside corner of intersecting walls.

The panels which form the concrete wall forms have been constructed of various different materials. For example, wood panels constructed from plywood sheets supported by wooden studs have been utilized for a long period of time. Such wooden wall form panels, however, easily become damaged and require replacement.

More recently, concrete-forming panels constructed of metal, typically aluminum, have been utilized in lieu of the previously known wooden concrete-forming panels. Such metal concrete forming panels enjoy long life, high strength and relatively low cost.

In order to assemble the concrete-forming system, a plurality of metal panels are placed in a side-by-side relationship along the inside of the concrete wall to be formed. Similarly, additional panels are positioned in a side-by-side relationship along the outside of the concrete wall to be formed so that the inside and outside panels are spaced apart but generally parallel to each other thus forming the cavity corresponding to the desired concrete wall.

During a concrete pouring operation, the concrete exerts a great deal of pressure on the forming panels due to the weight of the concrete. Consequently, in order to maintain the concrete forming panels in a fixed position during the concrete pouring operation and until the concrete sets, it is necessary to lock the adjacent forming panels together. The panels are subsequently unlocked from each other after the concrete sets and the panels are reused in other jobs.

One such locking system for use with an aluminum panel system is disclosed in U.S. Patent No. 4,975,009 to Easton, which issued on December 4, 1990. In this concrete forming system, each panel included a pair of spaced apart sidewalls with a metal sheet extending over and covering the sidewalls. Each sidewall, furthermore, included a plurality of spaced apart openings so that, when two adjacent panels were positioned in a side-by-side abutting relationship, the openings in the sidewall of one panel registered with the openings in the abutting sidewall of the adjacent panel.

In order to lock the panels together, an elongated wall pin was slidably mounted to each panel so that one wall pin registered with one opening along one of the two sidewalls. This wall pin, furthermore, was laterally slidable

between an extended position, in which the wall pin extended through the registering openings in the adjacent side panels, and a retracted position in which the wall pin was retracted from at least the opening in the adjacent panel. An enlarged diameter collar on the wall pin abutted against the sidewall in its associated panel when the pin was in its extended position.

With the wall pin in its extended position, a wedge-shaped latch, commonly called a wedge, was then inserted through a transverse opening in the wall pin adjacent the free end of the wall pin in order to lock the wall pins, and thus the adjacent panels together.

While the previously known aluminum concrete forming panel systems were adequate for forming the cavity to receive the concrete, special problems arose for the inside corner form used to complete the cavity at the inside of two intersecting wall sections as well as narrow wall sections. These previously known inside corner wall forms typically comprise two wall sections which lay in perpendicular planes relative to each other and intersect each other. The side walls of the inside corner abut against the side walls of the adjacent wall panels. The side walls and wall sections of the corner form may comprise either a single extrusion, or a multi-piece assembly.

The wall sections for the inside corner form, however, are typically very narrow, i.e. only a few inches wide. As such, it is difficult to drive the locking pin through the registering openings in its side wall and the adjacent panel. This is particularly true since it is oftentimes necessary to exert a substantial force on the pin in order to drive the pin through the registering

openings, particularly when the openings in the corner form and its adjacent panel are not precisely aligned.

SUMMARY OF THE PRESENT INVENTION

The present invention provides a concrete-forming panel system which overcomes all of the above-mentioned disadvantages of the previously known systems and is particularly well suited for an inside corner form.

In brief, the concrete panel forming system of the present invention comprises at least two concrete forming panels wherein each panel has a pair of spaced apart side rails. The side rails are constructed of metal, preferably aluminum, while a metal sheet extends across and between the side rails. In the case of the corner panel, a metal sheet or extrusion extending between the rails and including two rail sections which are generally perpendicular to each other.

Each side rail includes preferably several spaced apart openings along their length. The rails are also adapted to be positioned in a side-by-side relationship so that a first sidewall of one rail abuts against a second sidewall of its adjacent rail. In doing so, the openings in the first sidewall of the first rail register with the openings in the second sidewall of the second rail.

An elongated wall pin is pivotally mounted by an arm to its associated panel, preferably an inside corner panel. The arm is pivotally mounted between a retracted position and an extended position. In its extended position, the arm moves its attached wall pin through the registering openings in the adjacent panels thus locking these panels together. Conversely, in its retracted

position, the wall pin is retracted from the registering opening in the adjacent panel, but is preferably partially inserted in through the opening of its own panel.

In use, the pivotal connection of the locking pin by the arm to its associated panel facilitates locking the adjacent panels together, particularly when the panel is used in a confined space, such as an inside corner. However, no undue limitations should be drawn therefrom since the locking pin with its associated pivot arm can also used with flat panels of narrow widths.

BRIEF DESCRIPTION OF THE DRAWING

A better understanding of the present invention will be had upon reference to the following detailed description, when read in conjunction with the accompanying drawing, wherein like reference characters refer to like parts throughout the several views, and in which:

FIG. 1 is a top plan view illustrating a preferred embodiment of the present invention;

FIG. 2 is an exploded fragmentary view illustrating the preferred embodiment of the present invention;

FIG. 3 is a front fragmentary view illustrating a portion of the preferred embodiment of the present invention and illustrating the pin in a retracted position; and

FIG. 4 is a view similar to FIG. 2, but illustrating the pin in an extended position.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT OF THE PRESENT INVENTION

With reference first to FIG. 1, a preferred embodiment of the concrete forming system 10 of the present invention is there shown and comprises at least two panels 12 and 14 which are employed to form a portion of the inside wall of a poured concrete wall. Other outside panels 16 and 18, which may be of any conventional construction, are used to form the outside of the wall of the concrete wall to be poured so that the panels 16 and 18 are spaced apart from the panels 12 and 14 and form a concrete receiving cavity 20 therebetween.

With reference to FIGS. 1 and 4, the panel 14, in the conventional fashion, includes a pair of spaced apart side rails 22 which are preferably constructed of aluminum. An aluminum panel 24 extends between the rails 22 to form a portion of the inside wall of the concrete wall to be formed. Each rail 22, further, includes at least one, and preferably a plurality of vertically spaced openings 26 (FIG. 4) along the length of the rails 22. The openings 26 in one rail 22 of the panel 14 are aligned with the openings 26 in the other rail 22 in the conventional fashion.

The other panel 12 is illustrated in FIG. 1 as an inside corner concrete forming panel. As such, the panel 12 includes spaced apart side rails 28 which are also preferably constructed of aluminum. An aluminum panel 30 extends between the side rails 28 to define the inside corner of the concrete wall to be formed. Unlike the panel 14, however, the wall 30 of the panel 12 includes two wall sections 32 and 33 which are generally perpendicular to each other and most likely are a continuous extruded piece. Likewise, the rails 28 of the

panel 12, while spaced apart from each other, lie in planes that are generally perpendicular to each other. The wall sections 32 and 33 and side rails 28 may be a single piece extrusion, or a multi-piece assembly.

Referring now to FIGS. 1 and 4, the side rails 28 of the inside corner panel 12 also include at least one, and preferably several spaced openings 34 along their length. These openings 34, furthermore, are positioned in a substantially identical manner as the openings 26 in the panel 14 so that, when the panels 12 and 14 are positioned in a side-by-side relationship, the openings 26 and the panel 14 register with the openings 34 in the inside corner panel 12. Preferably bushings 36, constructed of a hardened material, are positioned within the openings 26 and 34 in order to protect the relatively soft aluminum side rails 28 and 22.

With reference now to FIGS. 2-4, in order to lock the above side rails 22 and 28 together, an elongated wall pin 40 is aligned with the registering bushings 36 in the adjacent panels 12 and 14. This wall pin 40, furthermore, is movable between a retracted position, illustrated in FIG. 3, and an extended position, illustrated in FIG. 4. In its retracted position (FIG. 3), the wall pin 40 is retracted from the opening 26 in the adjacent panel 14 but is preferably at least partially positioned within the opening 34 of its associated panel 12. Conversely, in its extended position (FIG. 4) the wall pin 40 extends between the openings 26 and 34 of the adjacent wall panels 14 and 12, respectively, thus locking the adjacent panels 12 and 14 together.

In order to move the wall pin 40 between its retracted position and its extended position, a generally L-shaped arm 50 has one end 52 pivotally

mounted to the panel 12 by a pivot pin 54. The other end 54 of the arm 50 is then pivotally secured to the wall pin 40 so that pivotal movement of the arm 50 simultaneously moves the wall pin 40 between its retracted position and its extended position. Furthermore, a stop pin 58 attached to the panel 12 limits the pivotal movement of the arm 50 to its retracted position.

In operation, the wall pins 40 with their associated pivot arms 50 facilitate the assembly of a panel 12 with a confined space, such as an inside corner form or narrow planar wall form, to its adjacent panel. Typically, after the panels 12 and 14 are aligned with each other, the locking pin 40 on the corner panel 12 may be easily driven to its extended position 40 by using a hammer to downwardly drive the arm 50 thus pivoting the arm 50 and its attached wall pin 40 its extended position. After formation of the concrete wall, the wall pin 40 may be easily returned to its retracted position by simply driving the wall pin 40 to its retracted position from the inside of its adjacent panel 14.

From the foregoing, it can be seen that the present invention provides a concrete forming panel system having a panel which is particularly well suited for use in confined spaces, such as an inside corner panel. Having described my invention, however, many modifications thereto will become apparent to those skilled in the art to which it pertains without deviation from the spirit of the invention as defined by the scope of the appended claims.

I claim: